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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/073,750 | 02/09/2002 | Grant M. Ehrlich | D-176-1 | 6093 |
| 7590 | 11/08/2004 | | EXAMINER | |
| John R. Doherty P.O. Box 706 Stevenson, CT 06491-0706 | | | DOVE, TRACY MAE | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1745 | |

DATE MAILED: 11/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|------------------------|------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 10/073,750 | EHRLICH ET AL. |
| | Examiner Tracy Dove | Art Unit 1745 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 05 August 2004.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 10-18 is/are pending in the application.
 - 4a) Of the above claim(s) 10-13 is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 14-18 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: _____.

DETAILED ACTION

This Office Action is in response to the communication filed on 8/5/04. Applicant's arguments have been considered, but are not persuasive. Claims 10-18 are pending. Claims 1-9 have been canceled. Claims 10-13 are withdrawn from further consideration. This Action is made FINAL, as necessitated by amendment.

Election/Restrictions

Applicant's election with traverse of Group II, claims 14-17 filed 1/7/04 is acknowledged. The traversal is on the ground(s) that a search for all claims would involve a search of the same extent and breath. This is not found persuasive because a method for coating a substrate (claims 10-13) requires a search in class 427. Group II, claims 14-17, does not require a search in class 427 because the claims are not directed toward a method. Claims 10-13 are withdrawn from further consideration as being drawn to a nonelected invention.

The requirement is still deemed proper and is therefore made FINAL.

Claim Objections

Claims 14 and 18 are objected to because of the following informalities: the claims recite "ethylenediamine *and* N-(2-amionethyl)3-aminopropyl-triethoxysilane *and* mixtures thereof", which is not proper Markush group language because the group should be closed by a single "and". Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 14-18 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for any of the single bonding promoters listed in claim 14 and/or claim 18, does not reasonably provide enablement for mixtures of the bonding promoters listed in claim 14 and/or claim 18. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make or use the invention commensurate in scope with these claims. The specification does not disclose mixtures of the bonding promoters.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 14-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The phrase "substantially uniformly dispersed" renders claims 14 and 18 indefinite. While the term "substantially" may be definite in view of the general guidelines contained in the specification, in this case, the specification fails to provide a definition for what is meant by "substantially uniformly dispersed" in claim 14 and/or in claim 18. Namely, how large of a concentration gradient, localized or across the sample, may the powdered coating material exhibit and still be considered substantially uniformly dispersed. For the purpose of examination, any composition wherein the concentration of a powdered material does not explicitly vary throughout the sample is taken to be substantially uniformly dispersed.

Claim 18 recites a weight percent for the active powdered material, a weight percent for the solid polymer matrix and a weight percent for the bonding promoter. However, the claim does not clearly state how these weight percents are related. The claim recites “a solid polymeric matrix composed of a mixture comprising from about 1 to about 10 weight percent of at least one host polymer . . . and from bout 0.001 to about 1 weight percent of a bonding promoter”. Thus, it is unclear how a solid polymer matrix is composed of at most 10 weight percent of polymer material. The specification states these weight percent ranges are based upon the total weight of the coating (page 9).

Claims Analysis

The phrase “a bonding promoter” is described in the specification as a crosslinking agent (page 4-5). The specific compounds recited in claims 14 and 18 are termed “cross-linking agents” on page 8 of the specification.

To the extent the claims are understood in view of the objections and rejections above, note the following prior art rejections.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 14-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koga et al., US 5,565,284 in view of Yoshimura et al., US 4,482,476.

Koga teaches a lithium secondary cell having a negative and/or positive electrode material bonded to a current collector surface by a binder containing a crosslinked polymer or formed by coating to a current collector a composition comprising an active material and a polymer binder containing a fluorinated polymer which is curable upon exposure to radiation, followed by radiation curing treatment (abstract). The object of Koga is to prevent the positive and/or negative electrode materials from shedding from the current collector (improve adhesion between coating and collector). A binder containing a crosslinked polymer is used for securing to a current collector surface a coating of carbon powder or layer lattice compound powder used as an active material for positive and negative electrodes of a lithium secondary cell (3:14-18). The layer lattice compound is preferably selected from composite oxides containing lithium (5:14-18). Vinylidene fluoride-propylene hexafluoride copolymer may be used as the polymer that is crosslinked (5:43-44). Polyvinylidene fluoride may be used as the polymer that is crosslinked (6:6). The binder may further contain another polymer such as polymethyl methacrylate (6:30-35). See also column 7, lines 20-52. The electrode may be prepared by mixing and dispersing the active material, binder polymer(s), crosslinking agent, radiation curable compound and various additives optionally with a solvent in a dispersion device to thereby from an electrode coating composition (11:5-21). The binder may be silane-crosslinked polyvinylidene fluoride wherein the crosslinking agent is vinyltris(β -methoxyethoxy)silane (13:30-38). The binder raw material is preferably added in an amount of 3 to 13 part by weight per 100 parts by weight of the electrode active material (6:36-41). The crosslinking agent is added in an amount of 0.5-10 parts by weight per 100 parts by weight of the polymer to be crosslinked (5:50-53). Example 1 discloses a specific example wherein the weight ratio of

binder raw material to graphite (carbon powdered coating material/active material) is 6:94 (11:59-60). The examples disclose a specific example wherein the weight ratio of LiCoO₂ to graphite to binder is 89:5:6 (14:33-34).

Koga does not teach the specific bonding promoters (crosslinking agent) of the claimed invention.

However, Yoshimura teaches a fluoroelastomer-containing electrically conductive coating composition comprising a fluoroelastomer, a fluororesin, a coupling agent (crosslinking agent) and an electrically conductive material (abstract). The coating composition is used for coating various kinds of substrates such as metals, plastics, rubbers, glass, ceramics and fabrics (1:15-20). The fluoroelastomer is preferably vinylidene fluoride/hexafluoropropylene copolymer (2:24-28). The coupling agent is preferably a silane coupling agent (2:66-67). Particularly preferred are aminosilane compounds. The silane coupling agent may be represented by the formula (I) in column 3, lines 1-14. Preferred examples of silane coupling agents are N- β -aminoethyl- γ -aminopropyltrimethoxysilane and N-(trimethoxysilyl-propyl)ethylenediamine. These two compounds are most preferred since they not only serve as a vulcanizing agent of the fluoroelastomer but also improve the adhesivity of the coating film to the substrate (3:21-38). The electrically conducting material may be a conventional one such as carbon, graphite, metals or an antistatic agent (4:23-31). The coating composition is applied onto the substrate and cured. The coated film has excellent adhesivity to the substrate and good mechanical properties, particularly tensile strength (5:37-54). The coating composition of Yoshimura may be applied to various electrical components such as an electrode (5:55-6:12). Yoshimura teaches the amount of electrically conductive material may vary with fields of application of the coating composition

and the kind of material. The amount of material can be easily determined by those skilled in the art (5:15-23).

Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because one of skill would have known that any known silane crosslinking agent for fluorine containing polymers could be used for the crosslinking agent of Koga. Yoshimura represents the coupling agent by the formula $R^1SiR^2_3$._a R^3 where R^2 and R^3 may be a C1 to C10 alkoxy and R^1 may be N-(2 aminoethyl)-3-aminopropyl (3:3-20). If R^2 and R^3 are chosen as ethoxy groups, the resulting coupling agent would be N-(2-aminoethyl)-3-aminopropyl-triethoxysilane. Preferred examples of silane coupling agents are N-β-aminoethyl-γ-aminopropyltrimethoxysilane and N-(trimethoxysilylpropyl)ethylenediamine. It would have been obvious to use any of the possible coupling agent given the reasonable expectation of equivalent results and absent a showing of criticality. One of skill in the art would have been motivated to combine the teaching of Koga and Yoshimura because both reference are directed toward improving the adhesion between a coating composition and a metal substrate by using a cross linked fluoropolymer such as polyvinylidene fluoride or polyvinylidenefluoride-hexafluoropropylene in the coating composition.

Response to Arguments

Applicant's arguments filed 8/5/04 have been fully considered but they are not persuasive.

The rejection of claims 14-18 under 35 U.S.C. 112, 2nd, is maintained. The term "substantially" is a relative term and thus does not have a "usual and customary meaning" as asserted by Applicant. Furthermore, Examiner did not provide a "definition" for "substantially"

as asserted by Applicant. The Examiner merely stated how the term “substantially” was being interpreted for the purpose of applying prior art. Amendments to the specification cannot contain new matter.

The 35 U.S.C. 102(b) rejection of claims 14 and 15 as being anticipated by Yoshimura is withdrawn. Note that Applicant’s argument regarding the teachings of Yoshimura are not correct. The disclosed ratio “between 95:5 to 35:65” does not relate to the weight percent of powdered coating material in the film. The ratio cannot be correlated to teach or suggest anything about the powdered coating material weight percent because the ratio relates to the components of the polymer matrix only. The ratio reflects the weight ratio of a fluoroelastomer to a fluororesin. Yoshimura teaches the amount of electrically conductive material may vary with fields of application of the coating composition and the kind of material. The amount of material can be easily determined by those skilled in the art (5:15-23).

The rejection of claims 14-18 under 35 U.S.C. 103(a) as being unpatentable over Koga et al., US 5,565,284 in view of Yoshimura et al., US 4,482,476 is maintained. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Applicant states Koga does not teach the bonding promoters of the claimed invention, however, Yoshimura teaches this limitation. Applicant states that films or coatings prepared using PVDF and PVDF-HFP copolymers such as disclosed by Yoshimura, do not adhere well to themselves and thus are brittle unless large amounts of the binder are used. However, both Yoshimura and Koga teach the polymer films are crosslinked to improve

adhesion. Koga teaches the weight percentages of the claimed invention. The weight percentages referred to by Applicant are not the weight percentages for the polymer contained in the film coating. The section of Yoshimura recited by Applicant relates to forming the fluoroelastomer, not the film coating. Yoshimura does not disclose a battery containing large amounts of binder, thus, this argument is not persuasive.

Examiner points out that Koga is the primary reference and Yoshimura is applied to teach a specific silane crosslinking compound. Koga teaches the binder may be silane-crosslinked polyvinylidene fluoride wherein the crosslinking agent is vinyltris(β -methoxyethoxy)silane (13:30-38). Applicant has not addressed the specific teaching of Koga or why one of skill in the art would not have been motivated to use the crosslinking compound of Yoshimura for the silane crosslinking compound of Koga. Therefore, Applicant's arguments are not persuasive.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is 571-272-1285. The examiner can normally be reached on Monday-Thursday (9:00-7:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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Art Unit 1745

November 3, 2004